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Finding the Value in Healthcare Information Technologies

By
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Today, healthcare executives are under tremendous pressure to address a host of system ills: medical errors, rising costs, inconsistent quality, inefficiency, declining clinician job satisfaction, and mounting staffing shortages. Treating these ills will lead ultimately to better healthcare, but the process for realizing these goals appears as complex and overwhelming as the challenges themselves.

Many senior leaders seek to address healthcare system complexity and inefficiency with information technology (IT). Information – or lack of it – is a big part of these problems. Accordingly, IT should be a big part of the solutions. In *Crossing the Quality Chasm*, the Institute of Medicine highlighted IT as integral to improving healthcare (IOM, 2001).

Healthcare information technology (HIT) is big business. In 1997, IT vendors sold $15 billion worth of goods and services to healthcare organizations. In 2002, Kaiser-Permanente, which has 8.5 million members, committed to spending $1.5 billion during the following four years for a single IT project – conversion to Electronic Medical Records (EMRs).

Hospital and health system executives hope that such investments will help healthcare providers reach their goals of better care delivery. Discrete evidence supports this hope. For example, Computerized Provider Order Entry (CPOE) systems have been proven to reduce serious medication error rates by 55% in inpatient settings (David Bates, 1998).

It turns out, however, that inpatient CPOE is a rare case regarding demonstrated benefit. Few rigorous studies prove the value of other HIT implementations. And even with CPOE, the data is specific to the clinical benefits, with little attention paid to financial or organizational value.

Instead, healthcare executives must rely on anecdote, inference, and opinion to make critical IT decisions. There is anecdotal evidence, for instance, that executives share with one another about the benefits of a given system, or that vendors prepare in the form of case studies. There are conclusions about IT's return on investment and increased productivity from other industries. And there are the judgments and opinions of highly qualified, and perhaps unbiased experts. *But there is very little hard evidence demonstrating the value of specific HIT investments*.

As a result, healthcare executives have largely been forced to make decisions about IT investments based on cursory evidence at best, and occasionally based on instinct, or hope, at worst. Inevitably, this approach produces decisions that may not yield the hoped-for benefits. As a result, HIT is viewed as falling short in helping to address the problems plaguing healthcare.

Lack of Evidence of Value

To better understand the current state of value assessment in the healthcare IT literature, analysts at the Center for Information Technology Leadership (CITL) reviewed a sample of studies from academic, industry, and provider sources. We analyzed multiple studies aiming to answer the question that all hospital and health system CIOs face when making IT acquisition decisions: What are the *demonstrated* benefits of a given system or application? We found few concrete answers.

A good deal of the current literature is conceptual. Rather than discuss demonstrable benefits of HIT, about one-quarter of sources did not address specific benefits at all. Instead, these largely theoretical works discussed value assessment frameworks or barriers to value realization. Benefits like cost containment or outcomes improvement were mentioned with little if any supporting primary data.

Further, researchers take a narrow view of HIT value. Rather than presenting data on a full spectrum of benefits – financial, clinical, and organizational – most studies focused on one or two benefits of a given HIT. For example, discussions of value focused on either financial (cost reduction, revenue enhancement, productivity gains) or clinical (service delivery advances and clinical outcome improvements) benefits. And for type of benefit, e.g., financial, researchers tended to assess one category over others – cost reduction more than revenue enhancement or productivity gains. Meanwhile, organizational benefits such as risk mitigation and stakeholder (provider, patient) satisfaction improvements received scant treatment.

While a dearth of primary data is a key concern, we also found that little is being done to connect the islands of data that do exist. Literature reviews and market overviews comprised only a small fraction of located sources. Further, meta-analyses – important for drawing healthcare system-wide conclusions about the value of HIT – were virtually non-existent.

Solving the problem of missing data on HIT value requires research that measures value across a range of dimensions. While fairly straightforward, addressing the specific inadequacies of current research on HIT value necessitates a rigorous approach: a framework, a methodology, and a research agenda.

IT Value Framework

A framework that encompasses all of the important dimensions of value will enable researchers to create a complete picture and, consequently, help decision makers to make better healthcare IT decisions.

CITL defines healthcare IT value as the sum of financial, clinical, and organizational benefits directly resulting from the implementation of a given health information technology. A comprehensive representation of HIT value is derived by collecting and analyzing data for each dimension. (See Sidebar.)

While these dimensions are general and relevant to HIT across the continuum of care – for example, EMRs in both inpatient and ambulatory settings – some dimensions will be more applicable to certain types of healthcare IT than others. Additionally, some instances of HIT may provide positive value in one dimension while producing negative value – or risk – in another. For instance, many experts speculate that giving patients web-based access to their medical records would increase patient satisfaction and possibly improve clinical outcomes but also potentially increase legal exposure and, hence, malpractice litigation.

Research Methodology

A framework, however, is not enough. Healthcare executives live in a world of time, capital, and staff constraints. Decisions must be made and projects launched. But for any given healthcare information technology – established or emerging – it is unrealistic to expect comprehensive data for all dimensions of value.

Gathering sufficient evidence on HIT value therefore requires a blend of secondary and primary research techniques. The first step is a comprehensive review and synthesis of existing literature, considering equally the main sources of evidence: academic, industry, and provider. Next, interviews with HIT users, developers, and vendors supplement existing data on value and provide evidence where the literature is thin. Finally, opinions and interpretations of leading experts need to be captured and assessed.

A Research Agenda

For their part, researchers must build on previous studies of HIT value by examining new dimensions of value for technologies in a variety of care settings. For example, unanswered research questions include: Can handheld devices help mitigate risk, improve outcomes, and enhance hospital and health system revenues? Can Computerized Decision Support Systems improve provider productivity, clinical outcomes, and revenues while reducing costs? Answering these questions with evidence-based research and critical analysis will help healthcare IT executives more accurately shape expectations for total return on investment.

Researchers also need to help HIT executives understand how to integrate an appraisal of value from all the available fragments of data and apply it to their specific circumstances.

Performance data on specific types of HIT is scattered, incomplete, and spread across different sources such as peer-reviewed literature, trade journals, proprietary research, and conference proceedings. Researchers should address this shortfall by performing systematic reviews and syntheses of the evidence from the existing literature – generalizing the results of studies and making them applicable to all hospitals and health systems.

Value-Based HIT Decisions

No longer are hope, instinct, and assumptions sufficient bases for HIT decisions. Boards of directors want to know – and executives need to tell them – exactly what the demonstrated benefits are for a given system or application. The overall goal is to arrive at conclusions and recommendations that healthcare decision-makers and strategic planners can put to practical use.

A truly useful study of HIT value is one that captures all the benefits – both tangible and intangible – and provides sufficient evidence to drive effective HIT decision making. Better data about HIT value will enable healthcare vendors to optimize their product development decisions. And better knowledge about HIT value will enable healthcare providers to make better investment decisions.

Ultimately, better decision-making will speed the wider adoption of "best practice" HIT solutions and lead to higher quality and more efficient healthcare delivery. Today, however, lack of solid evidence is causing the industry to hesitate – and we cannot afford to let this continue. In short, we believe in our assumptions, opinions, and hopes, but that is not enough.

It is time for proof.

Sidebar: The Three Dimensions of Value for Healthcare IT

Research on value should focus on the relationships between HIT and these dimensions:

Financial

- **Cost reductions** issuing from decreased administrative clinical staffing and resource requirements (i.e., elimination of paper chart pulls and transcription services).

- **Revenue enhancements** resulting from improved charge capture and charge entry to billing times.

- **Productivity gains** stemming from increased procedure volume, reductions in average length of stay, and increased transaction processing rates.

Clinical

- **Service delivery advances** from better adherence to clinical protocols and improvements in the stages of clinical decision-making (i.e., initiation, diagnostics, monitoring and tracking, and acting).

- **Clinical outcomes improvements** represented as reductions in medical errors, decreases in morbidity and mortality, and expedited recovery times.

Organizational

- **Stakeholder satisfaction improvements** resulting from decreased wait times, improved access to healthcare information, and more positive perceptions of care quality and clinician efficacy.

- **Risk mitigation** resulting from decreases in malpractice litigation and increased adherence to federal, state, and accreditation organization standards.

Doug Johnston and Eric Pan are Senior Analysts, and Blackford Middleton is Chairman of the Center for Information Technology Leadership (CITL). CITL is a Boston-based, nonprofit research organization established in 2002 to guide the healthcare community in making more informed strategic IT investment decisions. Using a rigorous, analytic approach, CITL assesses clinical information technologies and disseminates its research findings to help healthcare providers realize greater value and improve quality of care. CITL's research is also used by technology vendors to develop more effective healthcare IT products. Chartered by Partners Healthcare, CITL is supported by a strategic alliance with Health Information and Management Systems Society and assisted by teams of experts in healthcare delivery, business, and informatics. For more information, visit www.citl.org.

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